

Remodeling of the spleen tissue

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An abbreviated version of this protocol was published in Science Advances in Jun 2020

Transforming the spleen into a liver-like organ in vivo

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Detailed protocol

The protocol of remodeling of the spleen tissue includes **surgical operation to translocate spleen, spleen observation and intra-spleen injection**
Surgical operation to translocate spleen (Video 1)

1. The mice were anesthetized with pentobarbital sodium via intraperitoneal injection

Anesthetize the animal at an initial dose of 80 mg/kg, 10~15 min ahead of surgery. You can carefully increase the dose until the animal has slow, shallow respiration and does not respond to toe pinch. In some cases, as much as 120 mg/kg may be required.

2. The fur of mice was wetted with 70% ethanol and was prevented from entering the peritoneum
3. A 2.5-cm-long skin incision was made between the last rib and the hip joint on the left side with a scissor
4. Any connective tissue under the skin should be loosen using the blunt end of the scissor

The spleen is easily seen through the peritoneum.

5. A 1~2-cm-long incision was made in the peritoneal wall
6. The spleen in the abdominal cavity was lightly pulled onto the exterior surface of the peritoneum and the mesentery between artery and efferent venule was cut away

Critical step: *Ensure the artery and efferent venule are intact.*

7. The peritoneal wall and the skin were closed with two separate sutures and three sutures, respectively

Critical step: *The sutures for closing the peritoneal wall should be as close as possible to blood vessels. This helps prevent the spleen from dropping into peritoneum. Suture knots should be as tight as possible to avoid loosening.*

8. Any blood was wiped up
9. Place the animal on an electric warming blanket. The mice were returned to a clean cage until the anesthesia wore off (30~60 min)

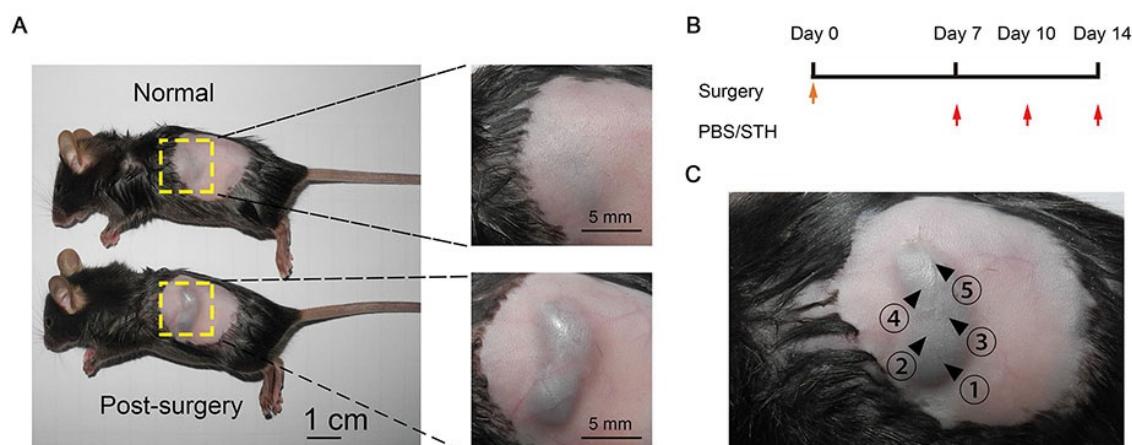
Spleen observation

1. After the translocation of the spleen, the spleen could be observed easily through the skin after hair removal

Intra-spleen injection (Video 2)

1. The mice were anesthetized with pentobarbital sodium via intraperitoneal injection
2. Lay the animal on its right side. Materials were injected into the subcutaneous spleen with a 30/31-gauge needle

Critical step: *A glass rod should be padded between animal and desk in case the spleen did not raise from the skin obviously. For remodeling the spleen using tumor tissue homogenate (STH) or PBS, we injected the pre-cooled agent into the spleen for three times, on day 7, 10 and 14 after the translocation operation. Each time, we injected 50 μ L – which is the maximal value that can be injected to the spleen – to five separate sites (10 μ L at each site).*



Spleen observation and intra-spleen injection. (A) Observation of normal mice (top) and the mice with translocated spleen (bottom). (B) Experimental plan of the surgical operation to translocate the spleen and intra-spleen injection of PBS or STH. (C) The sites of intra-spleen injection for remodeling the spleen tissue.

Related files

Video 1.mp4



Video 2.mp4



How to cite: (Readers should cite both the Bio-protocol preprint and the original research article where this protocol was used)

1. Wang, L., Zhang, J., Wang, C. and Dong, L. (2021). Remodeling of the spleen tissue. Bio-protocol Preprint. [bio-protocol.org/preprint1121](https://doi.org/10.21969/bio-protocol.1121).
2. Wang, L., Wang, C., Wang, Z., Gan, J., Liu, C., Xia, S., Niu, Y., Chen, D., Zhang, J. and Dong, L. (2020). Transforming the spleen into a liver-like organ in vivo. Science Advances 6(24). DOI: [10.1126/sciadv.aaz9974](https://doi.org/10.1126/sciadv.aaz9974)

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